

## **REMARKS**

### **The Pending Claims:**

Claims 1-16 are pending and under active consideration.

### **The Amendment:**

Claim 1 is currently amended. The Office Action mailed on 8/31/06 acknowledged that the application as filed supported quantum dot nanoparticles that have passivating layers (*see* pages 2-3), although contended that a separate step of “forming” the passivating layer did not find adequate support in the specification. While applicants disagree with the later contention, applicants have amended the claims commensurate with the support recognized by the Examiner. Furthermore, the “nonpolar” limitation is fully supported by the application as well, in particular, paragraph 105 of the specification.

Claim 17 is newly added and fully supported by the application as filed, in particular paragraphs 70 and 99 of the published application.

The amendment to the claims is made solely to obtain expeditious allowance of the instant application and not for reasons related to patentability. Amendment of the claims is made without prejudice, without intent to abandon any originally claimed subject matter, and without intent to acquiesce in any rejection of record.

Entry of the claim amendments is respectfully requested.

### **CLAIM REJECTION—35 U.S.C. § 103**

I. Claims 1-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bawendi (WO 00/17655 or US 6,319,429) in view of Kohn et al. (WO 99/24490). In view of the amendment and following remarks Applicant's respectfully traverse this rejection.

Claim 1 is directed in part to a method for preparing a population of water-dispersible quantum dot nanoparticles, comprising: admixing an amphipathic dispersant comprised of a polymer... with a plurality of passivated hydrophobic quantum dot nanoparticles, in a nonaqueous, nonpolar solvent, to provide an admixture of dispersant and quantum dot nanoparticles, in the solvent...

In the Office Action mailed on 8/31/06, the Examiner noted that Bawendi describes nanocrystal structures with a TOPO inner-coating and further having an outer surfactant coating such as AOT with a hydrophobic region and a terminal hydrophilic moiety (referring to Fig. 5B in US 6,319,429). The AOT forms a bilayer around the internal nanocrystal, with polar head groups facing out, thereby rendering the particle water soluble.

The Office Action acknowledges that Bawendi does not describe a polymer as claimed, but asserts that the polymers in Kohn fill that void. Kohn "relates to strictly alternating poly(alkylene oxide ether) copolymers that self-assemble in aqueous media to form micelles that are useful for the delivery of hydrophobic drugs." *Emphasis added*, Page 1, Technical Field.

The combination of Bawendi and Kohn yields a fundamentally different preparation than claimed (i.e. one formed in aqueous solvents). Furthermore, if the Examiner's argument is that Kohn poly(alkylene oxide ether) copolymers can form micelles in nonaqueous, nonpolar solvents, Applicants request that specific supporting evidence be made of record, as such theory seems contrary to the description in Kohn.

In view of the foregoing, withdrawal of the obviousness rejection to Claims 1-16 over Bawendi in view of Kohn is respectfully requested.

Furthermore, with respect to newly added claim 17, Kohn is directed to uniform block copolymers with strictly repeating subunits. Claim 17, is directed to a much different polymer wherein the hydrophilic and hydrophobic regions are randomly interspersed.

II. Claims 1-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bawendi (WO 00/17655 or US 6,319,429) in view of Ma et al. (U.S. Patent No. 5,221,334).

According to the Office Action, “[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to have used [Ma] copolymers of ABAB structure... as a dispersant in Bawendi et al. instead of copolymer AB block structure...”

In the Office Action mailed on 8/31/06, the Examiner noted that Bawendi describes nanocrystal structures with a TOPO inner-coating and further having an outer surfactant coating such as AOT with a hydrophobic region and a terminal hydrophilic moiety (referring to Fig. 5B in US 6,319,429). The AOT forms a bilayer around the internal nanocrystal, with polar head groups facing out, thereby rendering the particle water soluble.

Ma requires that “[t]he ink is prepared by premixing the selected pigment(s) and acrylic block copolymer in water, a water soluble medium solvent, or the aqueous carrier medium.” Column 11, 1<sup>st</sup> sentence, *see* also all the Examples (1-10); column 11-12; and claims 1-14. In fact, the polymer and pigment in Ma are selected based on their ability to form an ink in an aqueous solution. Column 3, lines 25-35.

Claim 1 is directed in part to a method for preparing a population of water-dispersible quantum dot nanoparticles, comprising: admixing an amphipathic dispersant comprised of a polymer... with a plurality of passivated hydrophobic quantum dot nanoparticles, in a nonaqueous, nonpolar solvent, to provide an admixture of dispersant and quantum dot nanoparticles, in the solvent...

Nowhere in Ma or Bawendi is there any description of a preparation as presently claimed. In fact Ma, explicitly states that the premixing be done in aqueous/polar solvents and specifically formulates the block copolymers based thereon. Premixing the passivated hydrophobic quantum dot nanoparticles in a polar aqueous solvent, as required in Ma's method, is not claimed.

With respect to new claim 17, Ma describes AB or ABAB copolymers which are uniformly dispersed throughout the polymer. Ma describes "random polymers" as a negative control to show the purported superiority of the uniform AB or ABAB copolymers described therein. Column 17-18. Accordingly, Ma teaches away from the use of random polymers wherein the hydrophilic and hydrophobic regions are randomly interspersed.

Regarding obviousness, the U.S. Supreme Court recently clarified the legal standard, citing text from an earlier opinion: "Under § 103, scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined." *KSR Intern. Co. v. Teleflex Inc.*, U.S. 2007 (2007 WL 1237837 (U.S.)), at 6, citing *Graham v. John Deere Co. of Kansas City*, 86 S.Ct. 684. Notably, "[a] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *Id.* Finally, the Supreme Court clarified that a teaching away may be an indication of non-obviousness. *K.S.R v. Teleflex* at 18 citing *United States v. Adams*, 383 U.S. 39, 40 (1966)).

In view of the foregoing, Applicants respectfully request that the rejections to Claims 1-16 based upon Bawendi in view of Ma be withdrawn.

## **CONCLUSION**

In view of the foregoing, Applicants believe that the application is in condition for allowance and a notice thereof is respectfully solicited. If any issues remain in connection herewith, or a telephone interview would be of assistance in advancing prosecution of the application, the Examiner is respectfully invited to telephone the undersigned to discuss.

Prompt and favorable consideration of this response is respectfully requested.

Respectfully submitted,

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